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# A MASTODONT TOOTH FROM SZECHWAN, CHINA

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A short while ago one of us (Hooijer), while visiting Chicago Natural History Museum, came across a fossil molar labeled as follows: "Tooth of Young Mastodon; Sze-Chuan, China, gift of A. W. Bahr, New York, July 26, 1926. Field Museum, P14061."

We are greatly indebted to Mr. Bryan Patterson, Curator of Fossil Mammals at Chicago Natural History Museum, for having turned this interesting specimen over to us for description. The photographs were made in the American Museum of Natural History in New York.

The specimen here described (see fig. 54) is of considerable interest because it proves to be the first tooth of the genus *Synconolophus* to be found outside of India. The molar, which is thoroughly fossilized, has blue enamel and brown dentine and cement and evidently represents an upper right intermediate molar.

The tooth is almost completely preserved, and consists of three full ridge-crests or lophs, and in addition a small talon in front and a sizable talon behind. The anterior ridge-crest is worn down completely, while the posterior talon is just touched by wear. All of the worn cones show the enamel to be strongly corrugated, while heavy vertical grooves, from 2 to 4 mm. apart, are seen on the marginal surfaces of the outer and of the inner cones. The middle cone of the third loph is not yet confluent with the buccal cone, with which it is fused in the more worn second loph.

Not much is left of the anterior talon. On its anterior surface the tooth has an extensive contact facet, and the lingual two-thirds

A

B

FIG. 54. *Synconolophus* sp., upper right intermediate molar, Chicago Natural History Museum, no. P14061. A. Crown view. B. External lateral view. Both $\times 1$.

A

B

FIG. 55. *Synconolophus ptychodus* Osborn, left $DM^4$ and $M^1$, American Museum of Natural History, no. 19442. A. Crown view. B. External lateral view. Both approximately × ¼.

of the anterior enamel surface has been broken off. There is no sign of a posterior contact facet. The antero-posterior diameter of the crown, measured on the buccal side, is 80 mm., the width at the anterior loph is 49 mm., and at the middle loph it is 50 mm., while at the third loph the crown width at the base is 56 mm. Behind the third loph the tooth is gradually rounded off from side to side.

There are two main roots, both transversely broad in cross section and constricted in the middle. The anterior root supports the anterior loph, and the posterior, which is wider, is associated with the third loph. This so-called third loph is only the penultimate crest if the posterior talon is regarded as a fourth loph; in that case the posterior talon is limited to some cingular elevations rounding the tooth off smoothly at the back.[1] While the anterior root is simply pear-shaped in cross section, the posterior root has a small median anterior projection just above the central cone of the third loph. Between these two main roots there are two additional smaller roots that support the outer and the inner cone of the middle or second loph, respectively, and these roots, too, have about the same size relation as have the cones on the crown. No support of any kind, as remarked above, is given to the posterior talon, nor is the anterior talon provided with roots.

The cingulum is well developed buccally, forming knobs at the entrances to the transverse valleys, but it is much less distinct along the lingual base of the crown. There is little or no crown cement.

From the heavy crenulations seen in all of the enamel figures, as well as from the presence of vertical marginal grooves, there seems to be no doubt that the present molar belongs to the genus *Synconolophus*, the Siwalik proboscidean with its "multiplication of the cones and conules which finally render the molar a bewildering complex, of a warped, choerodont, ptychoid pattern." (Osborn, 1929, p. 10.) This genus, which was first described from the Siwaliks of India and until now has never been found beyond the Indian region, consists at the present time of four species (Osborn, 1936, pp. 654–665). In age these species range from the Lower Chinji into the

[1] This may seem an immaterial point, but it is always a matter of personal taste whether a big but not exactly full-sized terminal loph or plate in a proboscidean molar deserves to be counted with the ridges. The ridge formula for the molar now under discussion might be written as $\times 3 + 1$ or as $\times 4$; Osborn would perhaps have preferred to write the formula as 1/2–3–3/4. In the present case the roots are fortunately preserved, and the large posterior root is clearly seen to be placed above the third loph from the front while the hindmost transverse ridge merely forms a bulging out of the crown and, therefore, would seem to be most correctly named the posterior talon.

Dhok Pathan, that is, from the Late Miocene or Early Pliocene through the Middle to Late Pliocene (Colbert, 1942, pp. 1442–1447). A specimen in the American Museum, containing the left $DM^4$ and $M^1$ (type of *Synconolophus ptychodus* Osborn, A.M.N.H. no. 19442), is so extremely close to the present Chinese find that it would hardly be possible to separate the molar from Szechwan even subspecifically (fig. 55). The $DM^4$ of the Siwalik specimen is slightly smaller (length of crown 73 mm., width at first loph 44 mm.), the $M^1$ slightly larger (length 91 mm., width of first loph 55 mm.) than the Szechwan tooth, which is just about half-way between the two in size. The Siwalik $DM^4$ carries three lophs plus a small talon behind, while the $M^1$ possesses three lophs, plus a posterior talon fully equal to that of the Szechwan molar in relative and absolute size. The relation between the cones on the crown and the individual parts of the root system cannot be studied in the Indian specimen, but it seems from the visible evidence that the large posterior root is in the same position as it is in the Chinese molar.

Because of the great similarity between the Siwalik species and the Chinese find we prefer not to coin a new specific name for the Szechwan *Synconolophus*. This specimen bears evidence that *Synconolophus* extended into southwestern China.

As to the exact locality of the *Synconolophus* molar nothing can be added to the information on the Museum label. At Yenchingkou, near Wanhsien, Szechwan, Dr. Walter Granger collected fossil mammals for the American Museum of Natural History between 1921 and 1926. There is therefore a possibility that the mastodont molar came from the locality at which Dr. Granger worked. In a previous publication (Hooijer, 1951) the history of the collection made by Granger is presented, and it need not be repeated here; suffice it to say that there is no evidence whatsoever of the presence of mastodonts in the Yenchingkou collection as now preserved in the American Museum of Natural History.

However, in a note on new fossils from Wanhsien, Young (1939, pp. 330–331) figures and describes a left upper molar ($DM^3$) as *Mastodon* sp., and from the figure it does not seem improbable that this tooth represents *Synconolophus* too. This tooth, with a length of 44.5 mm. and maximum width of 38 mm., two lophs, a very large posterior talon and strong inner cingulum, could very well be a third milk molar (not represented in the Siwalik collection) of the genus under discussion, but of course the original specimen

should be re-examined to determine this point. Most unfortunately the tooth mentioned by Young is a gift of a native, and though the collectors were told that it came from the same sites where Granger had been collecting, there is no certainty about this. Young (loc. cit.) presumes that in addition to the dominantly Middle Pleistocene[1] sites of Szechwan, some older fissure deposits do exist in the region, exactly as at Choukoutien. He suggests that to this earlier (Pliocene) series might well be referred the isolated *Nestoritherium* tooth, the only find of its kind in the collection made by Granger. However, the chalicothere tooth, although it does not bear a field number, is known to have been collected during Granger's 1921 field season and would consequently have come from one of the limestone pits. This cannot be said with certainty about the two Szechwan mastodont molars of which we now have evidence. If the age of the Chinese representative of this mastodont genus can be taken as roughly the same as that of the Siwalik species, namely, Late Miocene or Pliocene, it would seem to be too old to go with the Yenchingkou fauna of Szechwan.

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[1] Young actually writes: "Lower Pleistocene," but it now seems probable that the age of the Yenchingkou pits fauna is Middle Pleistocene; it is definitely post-Villafranchian. Teilhard de Chardin and Trassaert (1937) distinguish three main zones in the Upper Cenozoic of southeastern Shansi. These are Zone I, of Pontian age, Zone II, of "Middle Pliocene" age (with *Mastodon borsoni*), and Zone III, of Villafranchian age. We believe that *Mastodon borsoni* is a definitive Villafranchian type, as is *Archidiskodon planifrons*, found at the top of Zone II, but *Chilotherium*, still present in this zone, is generally regarded as of Pliocene affinities. Therefore we suspect that Zone II represents a mixture of faunas and probably should be subdivided, which is in fact indicated by Teilhard de Chardin and Trassaert (op. cit., p. 4).

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